Answers to Coursebook exercises

5 Shapes

Exercise 5.1   Regular polygons

1 **a** **i** Square   **ii** Equilateral triangle
   b **i** 90° and 90°   **ii** 60° and 120°

2 **a** $360° ÷ 6 = 60°$ **b** $180° − 60° = 120°$ Check students' reasons.

3 **a** $360° ÷ 8 = 45°$ **b** $180° − 45° = 135°$ Check students' reasons.

4 **a** $180° − 144° = 36°$ **b** 10

5 $360 ÷ 30 = 12$

6 $360 ÷ 18 = 20$

7 $180 − 168 = 12, 360 ÷ 12 = 30$

8 $360 − 36 = 324, 324 ÷ 3 = 108, 180 − 108 = 72, 360 ÷ 72 = 5$; the shape is a pentagon

9 $360 − 120 − 90 = 150, 180 − 150 = 30, 360 ÷ 30 = 12$

10 a   No. $360 ÷ (180 − 110)$ is not a whole number.
   b   Yes, 6   **c**   No   **d**   Yes, 9   **e**   Yes, 12

11   128.6° to one decimal place

12 a   72   **b**   180

Exercise 5.2   More polygons

1 **a** 900°   **b** 1260°   **c** 1440°

2 **a** 170°   **b** 90°, 80°, 70°, 60°, 50° and 10°. The sum is 360°.

3 104°

4 It is an octagon so they add up to 1080°.

5 They add up to 530°. For a pentagon they should add up to 540°.

6 $(N − 2) × 180 = 1800 → N − 2 = 10 → N = 12$. It has 12 sides.

7 **a** 120°
   b No. If four angles are 90° they add up to 360°. Then the fifth must be 540° − 360° = 180°. This is impossible.

Exercise 5.3   Solving angle problems

1 **a** $a = 180 - (35 + 40) = 105$
   b $b = 40$, corresponding angles

2 **a** $c = 68 + 54 = 122$, exterior angle of triangle
   b $d = 122 - 86 = 36$, using exterior angle of triangle

3 Third angle of triangle $= 180° - (25° + 40°) = 115°$. Angles of square and equilateral triangle are 90° and 60°.
   $d = 360 - (115 + 90 + 60) = 95$.

4 OAC is isosceles so $a = (180 - 54) \div 2 = 63$. The 54° angle is the exterior angle of isosceles triangle OBC so
   $b = 54 \div 2 = 27$.

5 The angles at Y and X are 90° and 105°. The sum of the five angles is 540°. $w = 540 - (90 + 90 + 105 + 105) = 150$.

6 **a** $x = 73$, alternate angles   **b** $y = 46$, alternate angles   **c** $z = 73$, corresponding angle to x

7 The angles of the pentagon and the hexagon are 108° and 120°. $a = 360 - (108 + 120) = 132$

8 Sum of angles $= 360° \rightarrow 5a = 360 \rightarrow a = 360 \div 5 = 72$

9 $a = 33$, isosceles triangle. Angle WYZ $= a° + 33° = 66°$, exterior angle of triangle XWY. $b = 180 - 2 \times 66 = 48$,
   angle of isosceles triangle. $c = 66 + 48 = 114$, exterior angle of triangle WYZ.

10 Extend AB. $e = d$, alternate angles.
    $a + e = 180$, angles on a straight line, so $a + d = 180$.
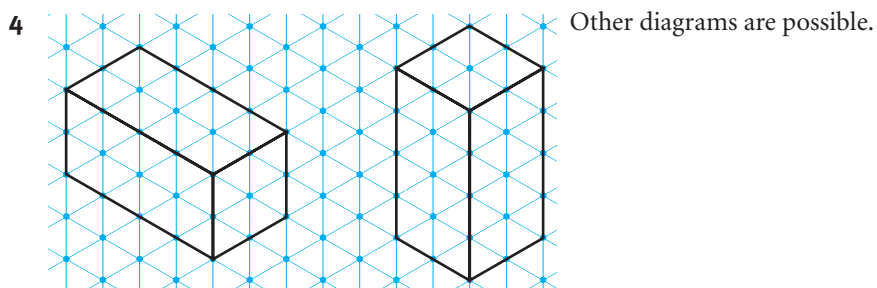   Similarly, $c = f$, alternate angles; $b + f = 180$, so $b + c = 180$.
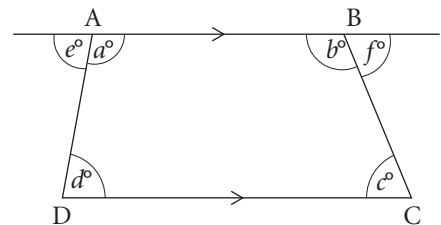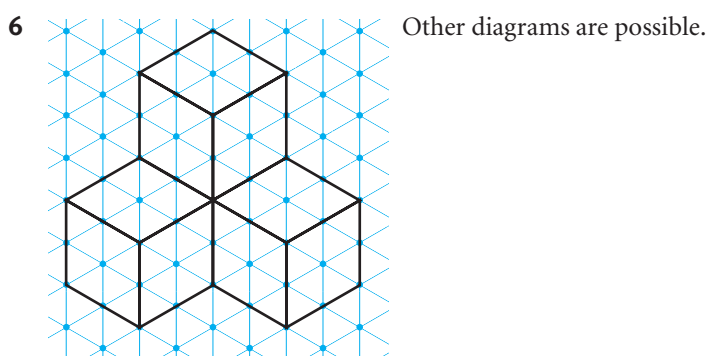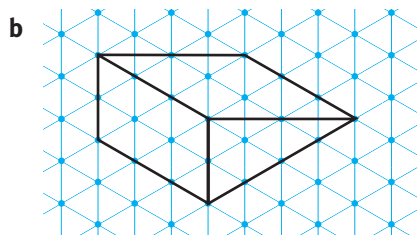
Exercise 5.4   Isometric drawings

1   Other diagrams are possible.

2
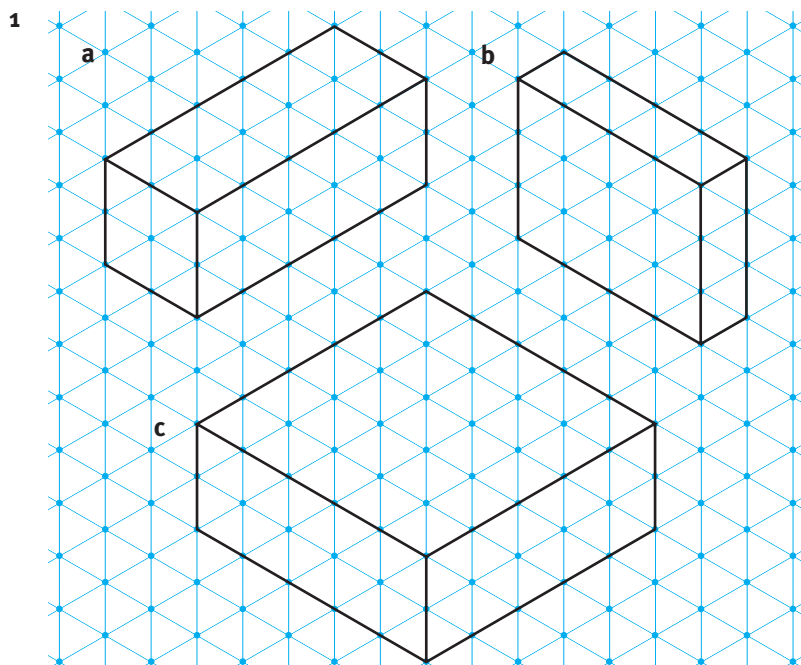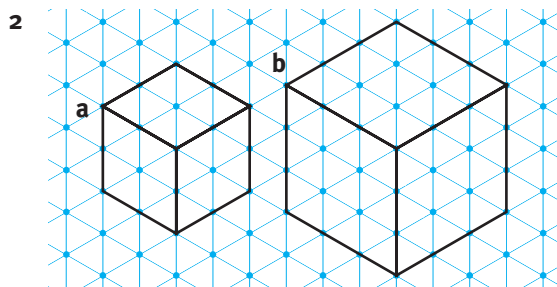
3 **a** 9 cm and 9 cm **b** 15 cm and 25 cm

4

Other diagrams are possible.

5 **a** green **b** brown

6

Other diagrams are possible.

7 **a** 3 by 4 **b**

Exercise 5.5   Plans and elevations

1 a

A   B   C

b

A   B   C

c

A   B   C

d

A   B   C

2

3 a

Other diagrams are possible.

b
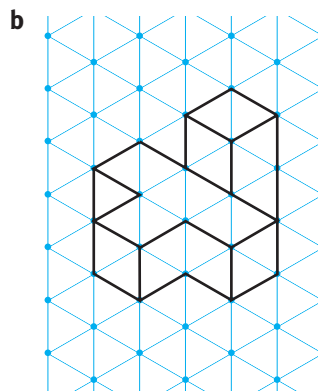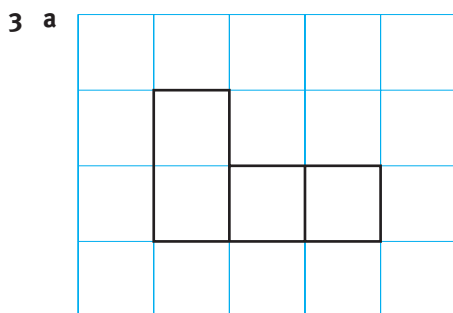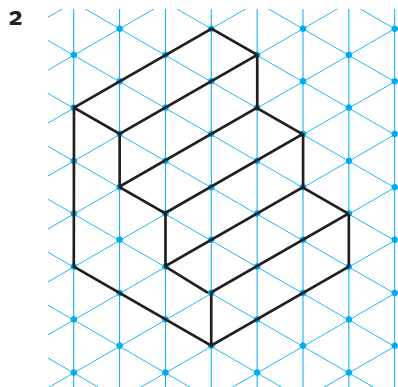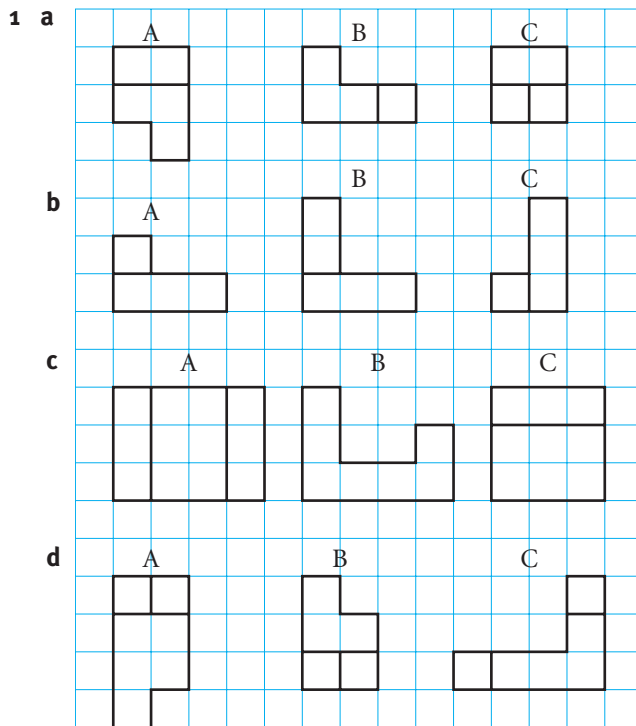
Exercise 5.6   Symmetry in three-dimensional shapes

1 a

b

c

2 a

b
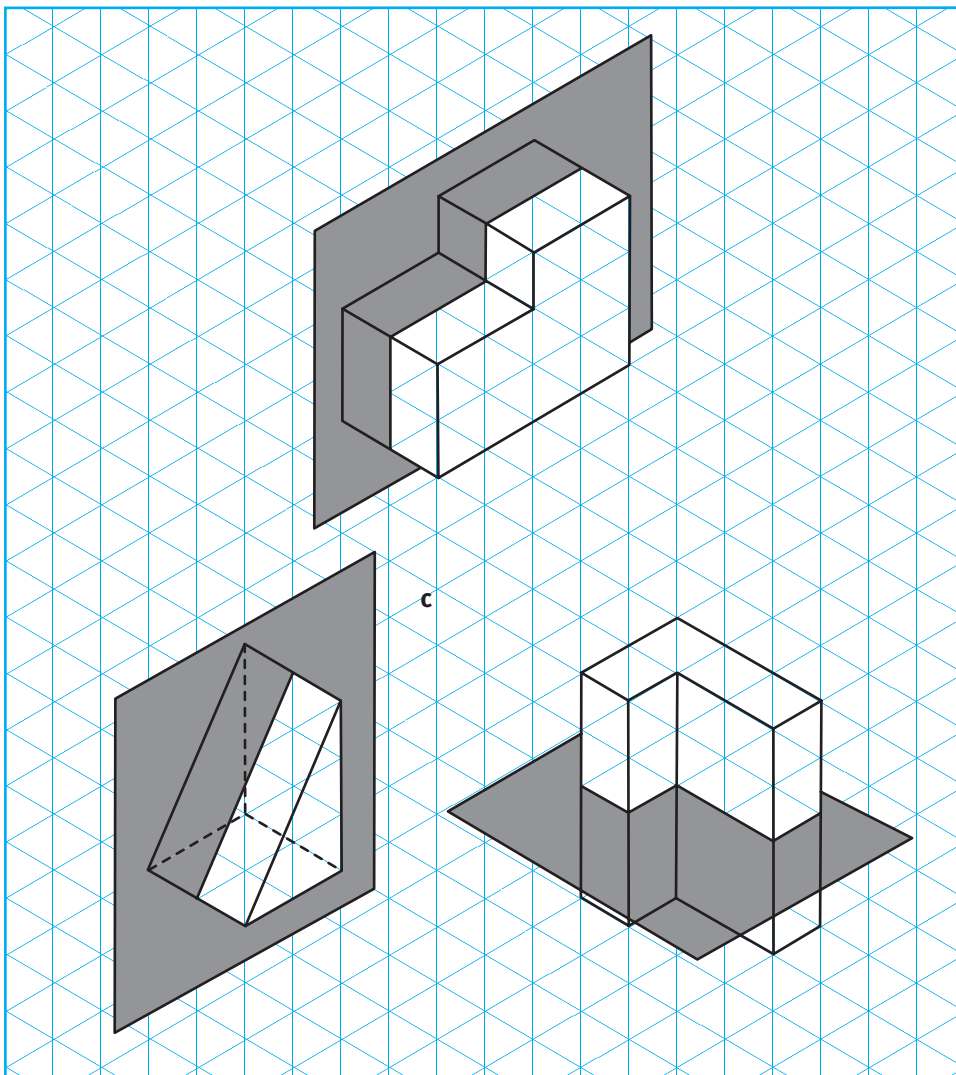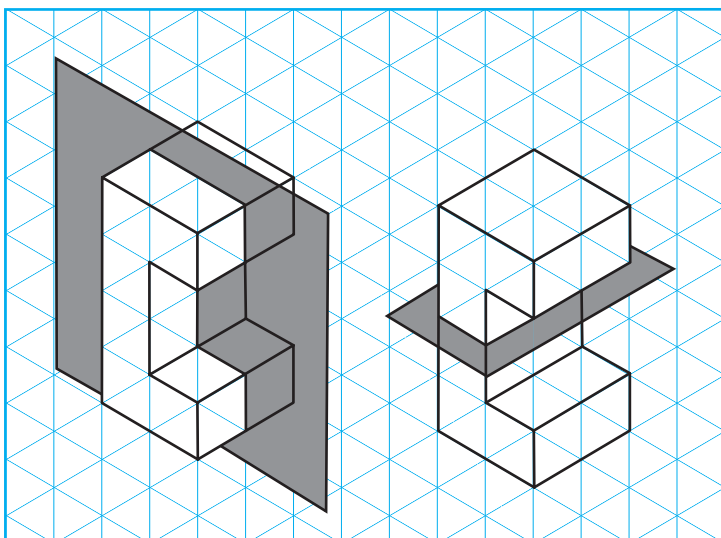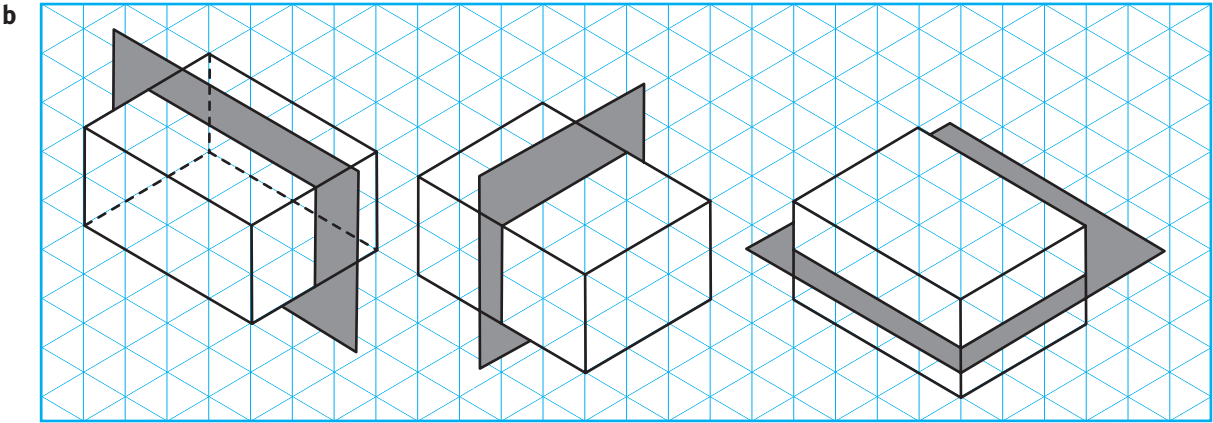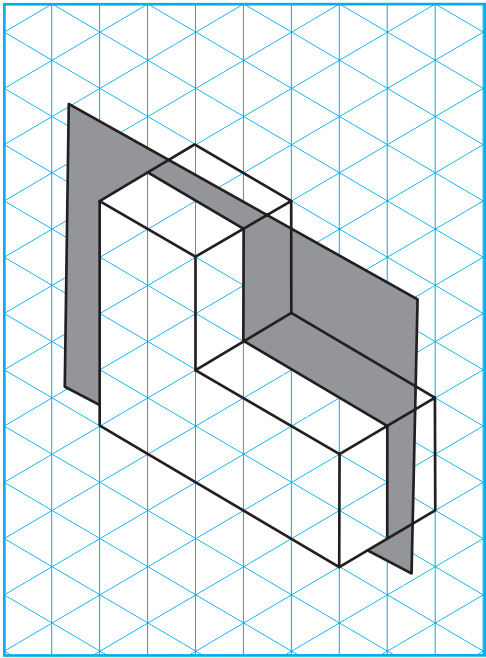
3 **a** 8 faces   **b** and **c**   Other diagrams are possible.

4 **a**   Other diagrams are possible.

b
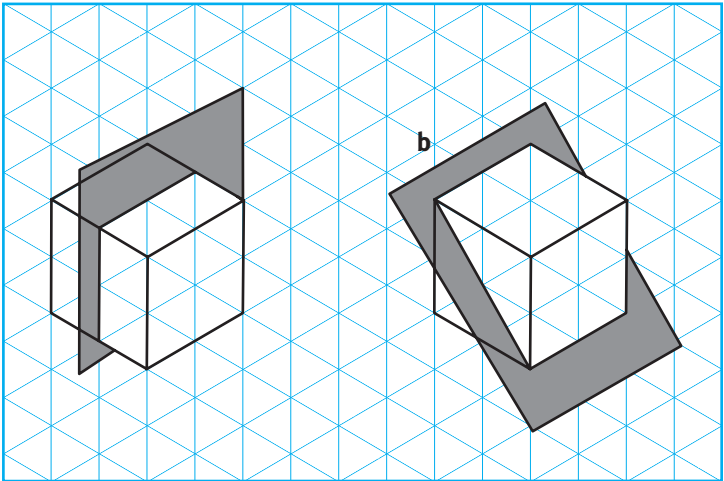
5 a and **b**
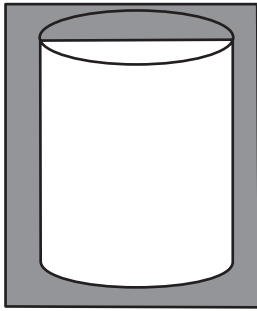
c
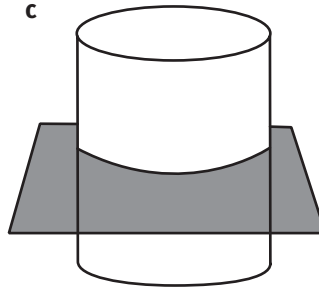
End-of-unit review

1 a 24°   **b** 156°

2 a 40°
  b OP and OQ are the same length because O is the centre of the shape.
  c 70°
  d The interior angle is twice the size of b and $2 \times 70 = 140$.
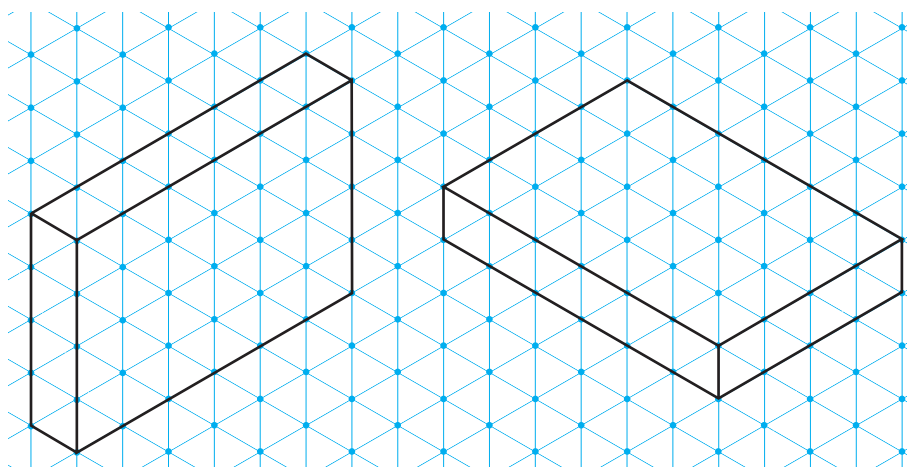
3 128°

4 a 46°, corresponding angles
  b 152°. Angle ECD = 28°, corresponding angles, and $b = 180 - 28$, angles on a straight line
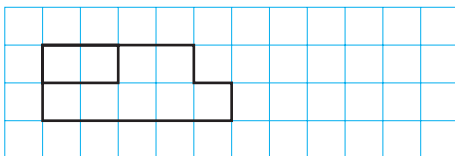
5 $c = 105 + 33 = 138$, exterior angle of a triangle
  $d = 180 - (87 + 33) = 60$

6

Other views are possible.

7 a

  b